

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 15.—“A Note on the Recrystallisation of Platinum.” By Walter Rosenhain, B.A. (Cantab.), B.C.E. (Melbourne). Communicated by Prof. Ewing, F.R.S.

The author has observed phenomena in platinum analogous to those of recrystallisation in other metals previously described by Prof. Ewing and himself (*Phil. Trans. A.* 1900, vol. cxcv.). It is well known that platinum which has received a prolonged exposure to high temperature becomes brittle and that its surface, if it has been exposed to flame, shows crystalline markings. This has been ascribed to the action of carbon, but the author ascribes it to a process of recrystallisation and subsequent surface etching by the flame. Evidence in favour of this view is drawn from the micro-structure of this “brittle” platinum, from its behaviour on etching with aqua-regia, and from its mode of fracture when hot. The micro-structure is shown to be that characteristic of recrystallised metals, the action of aqua-regia is found to brighten the flame-etched surface, and the fracture follows lines characteristic of the surface crystals, thus proving that the surface pattern truly represents the structure of the whole thickness of metal. The author points out that cold-worked metal is very apt to undergo recrystallisation at high temperatures, and that in several well-known cases brittleness results from such a process; he believes, therefore, that recrystallisation accounts for all the phenomena except the surface markings, and these he ascribes to an etching action of the flame in which the temporary formation of a carbide may play a part.

June 19.—“On an Approximate Solution for the Bending of a Beam of Rectangular Cross-section under any System of Load, with Special Reference to Points of Concentrated or Discontinuous Loading.” By L. N. G. Filon, B.A. (Cantab.), M.A., B.Sc. (Lond.), King's College, Cambridge, Fellow of University College, London, and 1851 Exhibition Science Research Scholar. Communicated by Prof. G. H. Darwin, F.R.S.

The paper investigates the elastic equilibrium of a long bar of rectangular cross-section in cases where the problem may be treated as one of two dimensions, the plane of the strain being the vertical plane through the axis of the bar.

General solutions in arbitrary functions are first obtained. These, on being applied to the particular case, lead to series involving hyperbolic sines and cosines. These series, when the length of the bar is made infinite, degenerate into integrals which can be expanded in ascending powers of the radius vector from any point, within a certain circle of convergence. The properties of these series and integrals in the neighbourhood of points of concentrated or discontinuous load are specially considered.

By means of these solutions, arbitrary conditions of stress over the top and bottom faces of the beam can be satisfied.

Various cases, including those of a doubly supported beam carrying a central isolated load, of a block resting upon a smooth rigid plane and pressed by a knife edge on its upper surface, of a beam under two equal opposite loads not in the same straight line, and of a bar under tension produced by knife-edge “grips” on either side, are considered.

The corrections that must be applied to the expressions given by de Saint Venant for stresses in the free parts of long bars, when we approach the points of application of concentrated loads, are investigated at length. It is found that, at distances from the sections where such load is applied of the order of the larger diameter of the cross-section, these corrections, *i.e.* the local perturbations, become insensible.

Finally, solutions in finite terms are discussed, and such a solution is obtained for a beam carrying a uniform load.

Physical Society, June 20.—Prof. S. P. Thompson, president, in the chair.—Mr. G. F. Herbert-Smith exhibited the three-circle goniometer recently constructed for the British Museum from his designs. In this form of goniometer the advantages of the earlier forms are combined: as with the two-circle or theodolite goniometer, a crystal is only once adjusted during the whole of the observations, and as with the one-circle goniometer observations are made in zones, and full advantage may be taken of the zonal characters of crystals and of the simple formulæ depending thereon.—A paper on the heat evolved or absorbed when a liquid is brought in contact with a finely

divided solid, was read by Mr. G. J. Parks. Pouillet discovered the fact that when a powder is put into a liquid which does not exert any solvent or chemical action upon it, there is, in general, a rise of temperature. The objects of the present investigation were to obtain a relation between the quantity of heat evolved and the area of the surface exposed, to find the rate of variation of heat evolved with temperature, and to apply to the results the laws of thermodynamics. From the results of his experiments the author states that when silica sand or glass is brought into contact with water at approximately constant temperature, the heat evolved is proportional to the area of the surface exposed by the solid, and the amount of heat developed per square centimetre is approximately $\cdot 00105$ calorie when the temperature is near 7°C . Assuming that the phenomenon of Pouillet is reversible, and that it is due to a pressure at the surface of the powder, the author has, by the application of the laws of thermodynamics and the results of his experiments, arrived at the conclusion that at 7°C . the surface-pressure of water and silica diminishes at the rate of 157 dynes per centimetre for an increase of temperature of 1°C . Experiments made at different temperatures indicate that the heat evolved is roughly proportional to the absolute temperature. Experiments were also made which showed a fall of temperature on putting a finely divided solid into mercury.—A paper by Prof. R. W. Wood, on a remarkable case of uneven distribution of light in a diffraction grating spectrum, was read by the Secretary. It is a well-known fact that in the spectra formed by diffraction-gratings the light is unevenly distributed, that is, the total light in any one spectrum will not recombine to form white light. The author has been examining a most remarkable grating in which the drop from maximum illumination to minimum occurs within a range of wave-lengths not greater than the distance between the sodium-lines. In other words, the grating at a certain angle of incidence will show one of the D lines, and not the other. Experiments with polarised light have proved that these anomalies are only exhibited when the direction of vibration (electric vector) is at right angles to the ruling. The paper gives a detailed account of the appearance of the spectra at different angles of incidence when the grating is in air and when it is immersed in different liquids. It is shown that the phenomena are not due to interference between disturbances coming from widely separated lines, and the author suggests that the matter must be referred to the form of the groove.—A paper by Prof. R. W. Wood, on the electrical resonance of metal particles for light waves (second communication), was read by the Secretary. In a previous paper the author has shown that granular deposits of the alkali metals exhibit brilliant colours by transmitted light. These colours were referred provisionally to the electrical resonance of the minute particles for light waves. The present paper gives an account of experiments made with gold and silver films to determine whether the resonance is molecular, or whether it is an electrical vibration of the metallic masses, smaller than the light waves, though of the same order of magnitude. Further investigations on the dispersion of the films and a more careful study with polarised light will doubtless throw light on the matter.—Prof. H. L. Callendar showed a simple apparatus for measuring the mechanical equivalent of heat.

Royal Microscopical Society, June 18.—Dr. Henry Woodward, F.R.S., president, in the chair.—The secretary read a note from Mr. Nelson on some high-power photomicrographs of *Pleurosigma angulatum*, *Surirella gemma* and *Coccinodiscus asteromphalus*, taken by Mr. F. E. Ives.—Mr. A. Hilger exhibited a new photo-measuring micrometer attached to a microscope designed specially for accurately measuring the distances between the lines of the spectrum, but it could also be used for various laboratory purposes.—Messrs. Watson and Sons exhibited and described a new two-speed fine adjustment for microscopes. They also exhibited a microscope fitted with a new holder by which metallurgical specimens could be held in any position while under examination.—Messrs. Carl Zeiss exhibited their epidiascope, a projection apparatus by means of which large brilliantly illuminated pictures of objects can be shown on a screen. Objects such as ordinary lantern slides and transparencies up to 9 inches square, opaque objects, such as photographs, drawings, prints, bones, medals, butterflies in their natural colours, &c., were shown in illustration of its capabilities. A simplified form of microscope was then attached to the instrument, and micro-slides were projected on the screen, giving pictures about 6 feet diameter, with great brilliancy and sharpness of definition.—Prof. Marcus Hartog gave a short

account of the structure of Acinetines, from observations on a species (*Choanophrya infundibulifera*) epizoic on Cyclops. He demonstrated that the spiral marking of the tentacles was due to a double-threaded constriction, that in protrusion and retraction there was no torsion, but only an opening and closing of the spiral, and that the tentacles were continued deep into the endosarc of the creature.—Mr. C. F. Rousset read his paper on the genus *Synchaeta*, with a description of five new species.—Mr. Walter Wesché gave a brief *résumé* of his paper on undescribed palpi on the proboscis of some dipterous flies, with remarks on the mouth-parts in several families. Specimens showing the palpi on several species were exhibited under microscopes.

Zoological Society, June 17.—Prof. G. B. Howes, F.R.S., vice-president, in the chair.—Mr. R. I. Pocock exhibited and made remarks upon the nest of a gregarious spider (*Stegodyphus dumicola*) sent home by Captain Barrett-Hamilton from Vredefort Road, Orange River Colony, South Africa.—Mr. Oscar Neumann exhibited specimens of some new and interesting mammals which he had discovered during his recent journey through Eastern Africa, and called special attention to some monkeys of the genus *Cercopithecus*, and to various species of hyraxes (*Procavia*).—Dr. Walter Kidd read a paper on certain habits of animals as traced in the arrangement of their hair. It was an attempt to interpret, in terms of certain characteristic habits, the departures from a primitive type of hair-arrangement. Short-haired mammals, chiefly ungulates and carnivores, were considered. The habits referred to were divided into passive (those of sitting and recumbent postures) and active (chiefly those of locomotion), and these were shown to match closely the variations observed in the direction of hair in the animals concerned.—Mr. F. E. Beddard, F.R.S., described the carpal organ which he had observed in a female specimen of *Hapalemur griseus* that had lately died in the Society's Gardens. He pointed out that this organ in the female differed in some details from that in the male.—Mr. R. I. Pocock read a paper on some points in the anatomy of the alimentary and nervous systems of the false scorpions of the order Pedipalpi.—A communication from Mr. H. J. Elwes, F.R.S., called attention to Mr. Lydekker's recently published description of a new elk, *Alces bedfordiae*, based on some unpalmed antlers and a skull of an elk from Siberia, and offered a remark that he thought it inadvisable to found a new species, or even a subspecies, on the material. Mr. F. E. Beddard, F.R.S., read a paper, prepared by himself and Miss Fedarb, descriptive of a new coelomic organ in the earthworm, *Pheretima (Perichaeta) posthuma*, which consisted of a series of sac-like structures on the floor of certain segments in the middle of the body.—Mr. Beddard also described some new species of earthworms belonging to the genus *Polytoreutus*, and made some remarks on the spermatophores of that genus.—A communication from Miss Igera B. J. Sollas contained an account of the Sponges obtained during the "Skeat Expedition" to the Malay Peninsula in 1899-1900. The collection contained examples of twenty-nine species, eleven of which had proved to be new and were described in the paper.—Mr. G. A. Boulenger, F.R.S., enumerated the eight species of fishes of which specimens were contained in a collection made Mr. S. L. Hinde in the Kenya district of East Africa. Four of them were new and were described by the author.—A communication from Mr. A. L. Butler contained a list of the species of batrachians—thirteen in number—that had been added to the Malayan fauna since the publication, in the Society's *Proceedings* in 1899, of Captain Flower's paper on the reptiles and batrachians of the Malay Peninsula.

Geological Society, June 18.—Prof. Charles Lapworth, F.R.S., president, in the chair.—The Great Saint-Lawrence-Champlain-Appalachian fault of America, and some of the geological problems connected with it, by Dr. Henry M. Ami. The extent, earth-movements and striking characteristics of this fault-line and of the geological formations which occur along this line of weakness in the earth's crust, with special reference to the formations in British North America, were discussed.—At this stage of the proceedings, Mr. E. T. Newton, F.R.S., took the chair at the president's request.—The Point-de-Galle Group (Ceylon): Wollastonite-Scapolite-Gneisses, by Mr. A. K. Coomaraswamy. The chief rock-types vary from basic pyroxene-sphene-scapolite-rock, through intermediate rocks composed of pyroxene, scapolite and wollastonite, with feldspar and quartz subordinate or abundant, to acid types made up of orthoclase-

microperthite or coarse-grained quartz-feldspathic rocks. They differ in several respects from the normal types belonging to the Charnockite series.—On the Jurassic strata cut through by the South Wales direct line between Filton and Wootton Bassett, by Prof. S. H. Reynolds, and Mr. Arthur Vaughan. In this section a thin bed of typical Cotham Marble is followed by the "White Lias," and that by the Lower Lias, which in this district attains a thickness of about 200 feet.

Linnean Society, June 19.—Mr. W. Carruthers, F.R.S., vice-president, in the chair.—Dr. W. G. Ridewood described a new genus of Copepoda occurring parasitically in the suprabranchial cavity of the lamellibranch *Lyonsiella*, and for which, on account of the great inflation of the thorax, he proposed the name *Obesiella*. He showed that the systematic position of *Obesiella* was next to *Ascomyzon*, in the family *Ascomyzontidae*.—Mr. George Massee described some of the results of modern methods of investigation in mycology, illustrating his remarks by means of lantern slides. He pointed out the errors of some observers who urged the suppression of genera wholesale on the evidence of a few species, and pleaded for the retention of familiar names until a clear case for their suppression had been established on evidence furnished by pure cultures.—Mr. W. P. Pyecraft read the second part of his contribution towards our knowledge of the morphology of the owls. This dealt with the osteology. After drawing attention to the close resemblances between the skeleton of the striges and that of the accipitres among the falconiformes, and pointing out the homoplastic character of these resemblances, he proceeded to discuss briefly the more important characters of the several genera, and of the nestling skull, which exhibited some curious relations between the squamosal, parietal and alisphenoid bones. The modifications referred to appear to fall under two heads. Especial stress was laid upon the relations of the squamosal. In some forms this bone was barely visible in the inside of the skull, whilst in others almost its entire inner surface was exposed, thus taking a prominent part in the formation of the cranial cavity.

PARIS.

Academy of Sciences, June 30.—M. Albert Gaudry in the chair.—On the structure and history of the lunar crust, remarks suggested by the fifth and sixth numbers of the photographic atlas of the moon, published by the Observatory of Paris, by MM. Loewy and P. Puiseux.—New researches on the liquid hydride of silicon, Si_2H_6 , by MM. H. Moissan and S. Smiles. The vapour density of this liquid silicon hydride has been determined at 100°C . by Gay Lussac's method, and has been found to be 2.37. The formula Si_2H_6 requires 2.14. The compound is not decomposed on heating to 100°C .; it is very soluble in ethyl silicate, but is only slightly soluble in water. The compound possesses very strong reducing properties, acting instantly on solutions of mercury perchloride, silver nitrate and gold chloride. The most remarkable property of this new hydride is its action on saturated compounds rich in chlorine or fluorine. An attempt to determine its solubility in carbon tetrachloride gave rise to a violent explosion immediately the two liquids came into contact, and the very stable sulphur hexafluoride gave rise to a similar reaction with detonation.—On some new properties of amorphous silicon, by MM. H. Moissan and S. Smiles. When liquid silicon hydride is decomposed by a series of electric sparks, amorphous silicon is obtained in a new form. It differs from the amorphous silicon prepared by the method of Vigouroux in possessing reducing properties towards potassium permanganate, sulphate of copper, mercury perchloride, and chloride of gold. These differences are attributed by the authors to the different state of division.—On appendicitis and its causes, by M. Lannelongue. A discussion of the history of appendicitis and its relations to other diseases of the intestines and peritoneum. Appendicitis is a microbial enteritis, rarely associated with a single micro-organism, several species usually being found in association.—The action of the X-rays on very small electric sparks, by M. R. Blondlot. It was discovered some years ago that the sparking distance for a given potential is increased under the influence of the X-rays; in the present paper a new action is described. Two pieces of metal are placed a small fraction of a millimetre apart, and kept at a potential difference slightly greater than that necessary to produce a spark in the absence of the X-rays. If this spark interval is now exposed to these rays, the spark becomes distinctly brighter. Suppress the X-rays, and the

spark returns to its original condition.—Signor Schiaparelli was elected a Foreign Associate in the place of the late Baron Nordenskiöld.—On a class of functional equations, by M. Ivar Fredholm.—On the integration of differential systems which are completely integrable, by M. E. Cartan.—On injection motors, by M. L. Lecornu. A thermodynamical analysis of the Diesel petroleum motor.—On the liquefaction of air, by M. Georges Claude. A description of an improved machine for the economical production of liquid air. Worked by an engine of 30 B.H.P. about 20 litres of liquid air per hour is produced, and from a second engine worked by the escaping gases about 6 B.H.P. is obtained, thus producing about 1 litre of liquid air per 1 B.H.P.—Remarks on the above paper, by M. d'Arsonval. It is pointed out that, although the theoretical possibility of the method used by M. Claude has always been conceded, the attempts of Siemens and Solvay were failures, and Linde, in fact, definitely stated that such an arrangement could not possibly work. The results obtained after two years' work are very promising.—Remarks by M. Cailletet on the same subject.—The precautions necessary in the use of Ruhmkorff coils in radiography, by MM. Infroit and Gaiffe. It was noticed in comparing radiographs taken by the aid of induction coils with those taken by the use of static machines that the latter were always perfectly sharp whilst the former were often wanting in clearness. This effect has been traced to the action of the magnetic field of the coil on the cathode flux of the bulb. On removing the Crookes tube to a sufficient distance from the coil, this effect was obviated.—The action of self-induction in the extreme ultra-violet portion of spark spectra, by M. Eugène Néculea. Details are given of the measurements with lead and zinc.—On the speed of the ions in a salt flame, by M. Georges Moreau.—On the magnetic properties of the ferrosilicons, by M. Ad. Jouve. The points of inflections on the curves given point to the existence of two definite compounds of iron and silicon in the alloys studied and no more, Fe_2Si and FeSi .—The centre of gravity of binary accords, by M. A. Guillemin.—On the double nitrites of iridium, by M. E. Leidié. The preparation and properties of the double nitrites of iridium with potassium, sodium and ammonium are described.—On the constitution of the aloins; comparison with the glucosides, by N. E. Léger. The aloins appear to belong to a new class of compounds, glucosides not split up by dilute acids.—On two new sugars extracted from manna, manneotetrose and manninotriose, by M. C. Tanret.—The action of carbon bisulphide on the polyvalent amino-alcohols, by MM. L. Maquenne and E. Roux. The polyoxyamines are attacked on warming with carbon bisulphide, giving cyclic combinations containing only a single atom of sulphur, probably oxazolines.—On the estimation of lecithin in milk, by MM. F. Bordas and Sig. de Raczkowski.—The mechanism of the synthesis of leucine, by MM. A. Vila and E. Vallée.—On the application of hot air as a method of heating non-volatile liquids in the form of spray, by M. J. Glover.—Variations in the state of refraction of the human eye according to the illumination, by M. Auguste Charpentier.—On the effects produced by the section of the semi-circular canals from the point of view of their stimulation and their paralysis, by M. Louis Boutan.—On the brain of the Phascolosome, by M. Marcel A. Héribel.—On the existence of elements corresponding to a primitive form of the sieve tubes in Gymnosperms, by M. G. Chauveaud.—On the density of sea-water, by MM. Thoulet and Chevallier.

NEW SOUTH WALES.

Linnean Society, April 30.—Mr. J. H. Maiden, president, in the chair.—The gummosis of the sugar-cane, by Mr. R. Greig Smith. From the gum of diseased stalks, *Bacterium vascularum*, Cobb, was isolated and purified. Under suitable conditions of nutrition, temperature and acidity, the bacterium produces, in the laboratory, a gum or slime which is chemically identical with the gum obtained from diseased canes. The gum is therefore not a pathological secretion of the plant, but is undoubtedly of microbic origin. For the formation of gum, saccharose or levulose is necessary; dextrose is not so useful, and the other commonly occurring sugars and carbohydrates are useless. Of the saline nutrients, phosphate is essential, and potash can be replaced by calcium or magnesium; sodium salts act as decided poisons to the microbe. The specific characters of the bacterium are described.—On a Gyrocotyle from *Chimaera Ogilbyi*, and on Gyrocotyle in general, by Prof. W. A. Haswell, F.R.S.—Notes from the Botanic Gardens, Sydney, No. 8, by Mr. J. H. Maiden

and Mr. E. Bettle.—Further remarks upon the mechanism of agglutination, by Mr. R. Greig Smith, Macleay bacteriologist to the Society.

GÖTTINGEN.

Royal Society of Sciences.—The *Nachrichten* (physico-mathematical section), parts ii. and iii. for 1902, contain the following memoirs communicated to the Society:—

February 8.—Lothar Heffter: On the theory of real curve-integrals. Walther Borsche: Xanthene derivatives from *p*-nitrophenol. O. Kellogg: On the theory of the integral equation $A(s, t) - A(s, t) = \mu \int_0^1 A(s, r) A(r, t) dr$.

February 22.—W. Nernst and A. Lessing: On the migration of galvanic polarisation through platinum and palladium plates. R. Straubel: Experiments on thermoelectric effects in tourmaline.

March 8.—J. O. Müller: On the minimal property of the sphere. E. Wiechert: Observations at Göttingen of the polar light. A. Schoenflies: On a fundamental theorem of the analysis of position. J. Elster: Dr. V. Cuomo's measurements of the distribution of atmospheric electricity in the open air at Capri.

May 3.—H. Ebert: Report of observations on atmospheric electricity at Munich in the year 1901–2. F. Exner: Report of observations on atmospheric electricity at the stations of the Vienna Academy.

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